

propulsion system 120 to move continuously downstream in one fluid motion and provide a downward pressure on drill bit 140. Each stroke approximates the length of housing sections 108, 112.

The Abstract paragraph on page 57.

The A drilling system includes a work string supporting a bottom hole assembly. The work string including lengths of pipe having a non-metallic portion. The work string preferably includes a composite umbilical having a fluid impermeable liner, multiple load carrying layers, and a wear layer. Multiple electrical conductors and data transmission conductors are embedded in the load carrying layers for carrying current or transmitting data between the bottom hole assembly and the surface. The bottom hole assembly includes a bit, a gamma ray and inclinometer instrument package, a propulsion system with resistivity antenna and steerable assembly, an electronics section, a transmission, and a power section for rotating the bit. The electrical conductors in the composite umbilical provide power to the electronics section and may provide power to the power section. The data transmission conduits in the composite umbilical transmit the data from the downhole sensors to the surface where the data is processed. The propulsion system includes two or more traction modules connected by rams disposed in cylinders for walking the bottom hole assembly up and down the borehole. The propulsion system includes a steerable assembly, controlled from the surface, for changing the trajectory of the borehole.

In the Claims:

1. (Amended) A system for conveying a well apparatus in a well, comprising:
 - a composite tube having a liner with a flow bore to circulate fluids and fibers wrapped in a predetermined pattern around said liner to carry axial load;
 - a conductor disposed in a wall of the composite tube [the fibers]; and
 - a propulsion system attached downhole to said composite tube.

17. (Amended) An apparatus for performing operations downhole in a well comprising:
 - a string of tubular members each having a liner with a flow bore to circulate fluids with fibers wrapped in a predetermined pattern around said liner to carry axial load, said

fibers forming a wall of non-metallic fibers having an axial component of modulus of elasticity greater than 500,000 psi;

a bottom hole assembly attached downhole to said string; and

a power conductor disposed adjacent said fibers in said wall and spirally wound around said liner [composite tube] providing power to said bottom hole assembly.

19. (Amended) The apparatus of claim 17 wherein said bottom hole assembly includes a propulsion system powered by drilling fluids and moving said string.

20. (Amended) The apparatus of claim 17 wherein said bottom hole assembly includes a bit connected to a three dimensional steering apparatus by an articulated joint to change a bend angle and angular orientation of the bend angle of said bit at said articulated joint.

23. (Amended) The system of claim 21 further including a steerable assembly having an actuator to adjust a bend angle between said formation displacing member and said bottom hole assembly and to adjust an angular orientation of the bend angle to alter [determining] the direction of the well path of said bottom hole assembly.

24. (Amended) The system of claim 21 further including a power section and propulsion system driven by fluids and providing power to said bottom hole assembly.

25. (Amended) The system of claim 21 wherein said composite tube has load-carrying layers of fiber engineered to provide tensile strength to said string.

34. (Amended) A bottom hole assembly for controlling the drilling of a borehole from a control at the surface, comprising:

a composite pipe extending into the borehole;

said composite pipe having a data transmission conduit coupled to the control;

a prime mover coupled to said pipe;

a downhole motor for rotating an output shaft having an articulation joint allowing said output shaft to have a bend angle and an angular orientation of said bend

angle, said output shaft operatively extending through a steerable assembly to rotate a drill bit;

[a drill stem attached to an orientation assembly and to a drill bit at one end for drilling the borehole;

said drill stem engaging said prime mover and said orientation assembly coupled to said data transmission conduit;

a steerable assembly connected to said prime mover and coupled to said data transmission conduit, said steerable assembly being in engagement with said drill stem];

said [orientation] steerable assembly sending signals through said data transmission conduit to the control and said steerable assembly receiving signals from the control;

said steerable assembly [deflecting said drill stem in more than two directions] having an actuator to adjust the bend angle and the angular orientation of the bend angle of the output shaft to direct said drill bit three dimensionally without rotation of said prime mover;

said prime mover adapted to move said drill bit upstream or downstream within the borehole in response to said signals received by said steerable assembly.

35. (Amended) A bottom hole assembly for use in drilling a borehole, comprising:

a pipe attached at one end to the bottom hole assembly and having a communication link disposed [in] within a wall of the pipe;

a downhole motor;

a drill bit;

a propulsion system;

an articulated joint forming a bend angle and an angular orientation of said bend angle [articulable three dimensionally] and having a first portion connected to said downhole motor and a second portion coupled to said drill bit, said second portion connected to said first portion in a manner to permit said second portion to form said bend angle and said angular orientation [be bent three dimensionally from a coaxial orientation from said first portion]; and

a steerable assembly in engagement with said second portion, said steerable assembly being in communication with said communication link to adjust said bend angle and said angular orientation of said bend angle to alter [bend] said second portion three dimensionally with respect to said first portion upon command to change the direction of said drill bit.

38. (Amended) A system for conveying a well apparatus in a well, comprising:

a string of composite tubes with one or more conductors disposed in a wall thereof and a flow bore to circulate fluids downhole in the well;

a propulsion system attached downhole to said string; said propulsion system being powered by the circulation fluids circulated through said flow bore and up an annulus formed by the composite tubes;

said propulsion system applying a downstream force on said string pulling said string downhole; and

said composite tubes having layers of fibers [being] engineered to cause said composite tubes to withstand axial and yield stress placed on said string.

44. (Amended) The system of claim 38 further including a three dimensional steering apparatus having a universal joint and an actuator for adjusting a bend angle and angular orientation of said bend angle of said universal joint.

45. (Amended) The system of claim 38 further including a drill member and a steerable assembly adjusting a bend angle and angular orientation of said bend angle between said drill member and steerable assembly for controlling the direction of said drill member.

46. (Amended) The system of claim 38 further including:

a drill bit connected to a downhole motor by an articulated joint, said articulated joint having a first portion connected to said downhole motor and a second portion coupled to said drill bit, said second portion connected to said first portion in a manner to permit said second portion to have a bend angle and an angular orientation of said bend angle with respect to [be bent from a coaxial orientation from] said first portion; and

a steerable assembly in engagement with said second portion, said steerable assembly being in communication with said communication link to alter said bend angle and said angular orientation of [bend] said second portion with respect to said first portion upon command to change the direction and/or angle of inclination of said drill bit.

53. (Amended) The apparatus of claim 17 wherein said bottom hole assembly includes an electronics section and a propulsion system [including] having a resistivity antenna, said resistivity antenna being connected to said electronics section for measuring the resistivity of the well.

54. (Amended) The apparatus of claim 17 wherein fibers are [said string of tubular members is] engineered [from a materials] to cause said string to achieve substantially neutral buoyancy in the fluids in the well.

58. (Amended) The apparatus of claim [21] 53 wherein said propulsion system includes a housing with an aperture receiving said resistivity antenna.

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64. (New) The apparatus of claim 17 wherein said wall has a modulus of elasticity ~~which is~~ not linear and has a yield strain which allows said wall to withstand loads placed on said string of tubular members.

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65. (New) The ~~apparatus~~ of claim 17 wherein said wall has a yield strain which allows said tubuar members sufficient bending to be spooled onto a spool; and said wall has a modulus of elasticity which is not the same in all axes.

66.. (New) The apparatus of claim 65 wherein said yield strain is at least 0.01818.

67. (New) The apparatus of claim 65 wherein said wall has a modulus of elasticity in an axial direction and a yield stress, said yield strain being a ratio of said yield stress to said modulus of elasticity.

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68. (New) The apparatus of claim 17 wherein said modulus of elasticity in the axial direction is in the range of 0.5 to 10.5 million psi.

69. (New) The apparatus of claim 17 wherein said modulus of elasticity in an axial direction is determined by dividing the yield strain into the yield stress required for said composite tube to be engineered for a particular well.

70. (New) The apparatus of claim 17 wherein said modulus of elasticity in an axial direction is at least 1.43 million psi.

71. (New) The apparatus of claim 67 wherein said yield stress is at least 26,000 psi.

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72. (New) The apparatus of claim 17 wherein said wall has a yield strain, modulus of elasticity in an axial direction, and a yield stress, said modulus of elasticity in the axial direction being determined by dividing the yield strain into the yield stress required for said wall to be spoolable.

73. (New) The apparatus of claim 17 wherein said tubular members have a density substantially the same as that of the wellbore fluids.

74. (New) The apparatus of claim 73 for drilling a wellbore using drilling fluids having a specific gravity between 8.4 and 12.5 pounds per gallon, further including a propulsion system attached downhole to said string applying a pull force on said string between zero and 14,000 pounds depending upon the specific gravity of the drilling fluids.